

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

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In the Matter of )  
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UPDATE TO PARTS 2 AND 25 CONCERNING )  
NON-GEOSTATIONARY, FIXED-SATELLITE )  
SERVICE SYSTEMS AND RELATED MATTERS )  
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IB Docket No. 16-408

**REPLY COMMENTS OF SPACE EXPLORATION TECHNOLOGIES CORP.**

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## SUMMARY

Most commenters joined Space Exploration Technologies Corp. (“SpaceX”) in supporting various Commission proposals that would expand opportunities for operators of non-geostationary satellite orbit (“NGSO”), Fixed-Satellite Service (“FSS”) systems. In addition, they offered suggestions to improve those proposals to better reflect the vibrant state of the NGSO industry and its need for operational and regulatory flexibility. The Commission should move expeditiously to evaluate and implement these proposals.

For example, there is widespread support for the proposal to adopt a more flexible milestone regime that better reflects operational realities facing NGSO systems. Commenters supplied a range of specific approaches for the Commission’s consideration, all of which allow additional time for deployment and less draconian penalties for failure to launch all satellites authorized. There is also unanimous support for proposals to increase spectrum available for FSS operations through reinstating prior allocation or designation decisions. In fact, many commenters urged the Commission not to limit the use of one band (17.8-18.3 GHz) to individually-licensed earth stations, but rather to grant such earth stations co-primary status while allowing blanket-licensed user terminals to operate on a secondary basis.

Commenters also generally support extension of the avoidance of in-line events spectrum sharing mechanism to additional bands, as the Commission has identified this mechanism as the most effective and efficient way to achieve equal access to spectrum, deter warehousing, and encourage inter-operator coordination. The Commission may, however, want to take this opportunity to consider whether different trigger angles would be appropriate in the context of the spectrum characteristics of different frequency bands. The Commission should also clarify that this sharing methodology applies to operations anywhere in the world, not only for U.S.-licensed

systems, but also for those non-U.S. licensed systems that have sought and received access to the U.S. market. The Commission long ago determined that non-U.S. systems must demonstrate their ability to comply with the spectrum-maximizing technical requirements applicable to U.S. systems in order to gain market access, and this principle should be applied here as well.

Commenters uniformly supported the Commission's proposal to eliminate the rule that, in spectrum where there are no criteria for GSO/NGSO sharing, precludes the grant of an NGSO license where a GSO license has previously been issued, and vice versa. However, the Commission should not implement the suggestion that this approach should be replaced with a default presumption that NGSO systems are required to protect GSO systems in all such bands, as there is no reason to reflexively favor one type of system over the other in the absence of a well-considered decision to do so. Similarly, the Commission should not adopt default operational rules at this early stage in the development of NGSO systems, as doing so could constrain ongoing innovation – especially with respect to systems that intend to provide broadband service directly to individual customers.

SpaceX commends the Commission for undertaking this effort to update its rules. Implementing the proposals discussed herein would result in a regime better tailored to the technological and market realities that face satellite operators today.

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Space Exploration Technologies Corp. (“SpaceX”) hereby replies to comments filed in response to the Notice of Proposed Rulemaking (“*NPRM*”)<sup>1</sup> in which the Commission has proposed revisions to certain rules and policies governing satellite services, especially those related to non-geostationary satellite orbit (“NGSO”), Fixed-Satellite Service (“FSS”) systems. Overall, commenters supported many of the Commission’s proposed updates to its rules, especially those that give NGSO systems greater access to spectrum or greater operational flexibility. SpaceX urges the Commission to implement rule revisions in a way best tailored to unleash the potential of such systems.

**A. THERE IS WIDESPREAD SUPPORT FOR CRAFTING A MORE FLEXIBLE MILESTONE REGIME**

Under the Commission’s current rules, all satellites authorized in an NGSO constellation must be launched and begin operations within six years of authorization.<sup>2</sup> Yet, as the Commission

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<sup>1</sup> *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, 31 FCC Rcd. 13651 (2016) (“*NPRM*”).

<sup>2</sup> *See* 47 C.F.R. §§ 25.137(d)(1) (milestone for non-U.S. licensees), 25.164(b) (milestone for U.S. licensees).

recognizes, an NGSO operator may not need to launch every space station in its authorized constellation in order to meet the rule's expressed objective of demonstrating its commitment to deploy a constellation, nor even to provide the services proposed in its application.<sup>3</sup> In recognition of this fact, a wide majority of commenters favors a more flexible milestone approach that better reflects operational realities facing NGSO systems.

For example, Boeing, Telesat, and Planet Labs/Spire Global joined SpaceX in arguing that operators should be required to satisfy an initial milestone by launching and operating the number of satellites necessary to provide a substantial commercial service within six years.<sup>4</sup> Others supported an initial milestone based on a percentage of the constellation deployed, ranging from a low of 10 percent to a high of 75 percent.<sup>5</sup> Once this initial milestone has been satisfied, the operator would be allowed to continue to deploy up to the full number of authorized satellites in its constellation. Some commenters would allow three years for this final deployment,<sup>6</sup> some an additional six years,<sup>7</sup> and some an undefined number of years so long as material expansion and commercial service continued.<sup>8</sup>

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<sup>3</sup> See *NPRM*, ¶ 32.

<sup>4</sup> See Comments of The Boeing Company at 19 ("Boeing Comments"); Comments of Telesat Canada at 18 ("Telesat Comments"); Joint Comments of Planet Labs Inc. and Spire Global, Inc. at 5 ("Planet Labs/Spire Global Comments"). Unless otherwise indicated, all comments referenced herein were filed on Feb. 27, 2017 in IB Docket No. 16-408.

<sup>5</sup> See Comments to the Notice of Proposed Rulemaking at 14 ("Space Norway Comments") (10%-20%); Comments of SES S.A. and O3B Limited at 32 ("SES/O3b Comments") (33%); Comments of LeoSat MA, Inc. at 15 ("LeoSat Comments") (50%); Comments of Lockheed Martin Corporation at 5 ("Lockheed Martin Comments") (75%).

<sup>6</sup> See Space Norway Comments at 14; LeoSat Comments at 22-23.

<sup>7</sup> See Boeing Comments at 18-19; Lockheed Martin Comments at 5.

<sup>8</sup> See Telesat Comments at 18; Planet Labs/Spire Global Comments at 5-7; SES/O3b Comments at 33.

These commenters recognize that modern NGSO constellations need greater flexibility for deployment than is afforded under the Commission's current rule. There is no evidence that any particular term of years is sufficient to allow deployment of the appropriate (much less optimal) number of NGSO satellites needed to support systems capable of providing the full range of current and future innovative services to customers. Requiring complete deployment within six years thus establishes an arbitrary limit on the size of such constellations. Instead, once an NGSO network has achieved sufficient deployment to begin commercial operations, it should be allowed to continue to evolve as necessary to meet capacity requirements, support additional services, and otherwise respond to market demands.

Only two commenters support maintaining the current inflexible milestone: OneWeb and ViaSat. OneWeb argues that requiring all satellites to be launched within six years deters speculation by those "who primarily hope to profit through regulatory gamesmanship."<sup>9</sup> As evidence of the dangers of speculation, OneWeb cites the 2 GHz MSS proceeding. But the comparison is inapposite, because in that service, the Commission employed a band allocation approach under which each licensee received designated spectrum for its own use.<sup>10</sup> By contrast, as the Commission has found, the in-line events sharing regime employed today ensures that "[t]here is neither any incentive nor any possibility for non-implemented systems to warehouse allocated spectrum at the expense of operational systems."<sup>11</sup> In addition, when the 2 GHz MSS

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<sup>9</sup> See Comments of OneWeb at 4 ("OneWeb Comments").

<sup>10</sup> See *Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands*, 20 FCC Rcd. 19696, ¶ 9 (2005) ("2 GHz MSS Order").

<sup>11</sup> *Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-Band*, 17 FCC Rcd. 7841, ¶ 29 (2002) ("Ku-band NGSO Sharing Order").

licenses were issued, the Commission had not yet adopted a bond requirement to enforce its milestones and thereby deter speculation.<sup>12</sup> Moreover, the fact that two 2 GHz MSS licensees actually deployed their systems before ultimately suffering bankruptcy may reflect a failure of business planning, but does not evidence an intention to engage in regulatory gamesmanship. Accordingly, there is no reason to anticipate that adopting a more flexible milestone would result in spectrum speculation.

For its part, ViaSat submits that loosening the milestone requirement could have adverse effects on smaller constellations because it would allow the deployment of larger constellations. ViaSat asserts that “[a]pplying the existing ‘band-splitting’ rule in a case like this, rather than requiring that the smaller system resort to ‘in-line avoidance,’ would facilitate more equitable spectrum sharing.”<sup>13</sup> Yet the in-line avoidance regime defaults to such band splitting, unless the parties can negotiate a mutually beneficial alternative. Accordingly, ViaSat’s concern does not withstand scrutiny. More fundamentally, ViaSat presents no compelling reason why the Commission should take the counterintuitive step of forcing band segmentation even in the absence of an in-line event – an approach that nearly all commenters reject.<sup>14</sup>

It is also worth noting that even those commenters who supported a terminal milestone date uniformly favored a less draconian penalty for failure to meet that milestone. Rather than license revocation, they argued that the Commission should cap the size of the NGSO constellation at the

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<sup>12</sup> See *2 GHz MSS Order*, ¶ 11.

<sup>13</sup> See Comments of ViaSat, Inc. at 22 (“ViaSat Comments”).

<sup>14</sup> See, e.g., Boeing Comments at 14; OneWeb Comments at 12; Comments of Space Exploration Technologies Corp. at 18 (“SpaceX Comments”).



level achieved by the milestone date.<sup>15</sup> Such a policy would better recognize the fact that an operator that has launched tens, hundreds, or even thousands of satellites but not completed deployment of its entire authorized constellation has demonstrated more than enough commitment to using orbital and spectrum resources to justify retaining the license. If the Commission adopts a milestone requirement that includes a terminal date by which all satellites in a constellation must be deployed, SpaceX would support this approach as a more appropriate remedy for those who deploy significant assets but cannot comply in full.

## **B. COMMENTERS SUPPORT EXTENSION OF THE AVOIDANCE OF IN-LINE EVENTS SPECTRUM SHARING MECHANISM**

### ***1. Most Commenters Support Application to Additional Bands***

In its initial comments, SpaceX supported the Commission's proposal to extend the avoidance of in-line events spectrum sharing mechanism to the Ku- and Ka-band spectrum available for NGSO operations.<sup>16</sup> Several other commenters endorsed this proposal as well. For example, as OneWeb notes, the Commission chose the avoidance of in-line interference mechanism from among competing alternatives because it provided equal access to spectrum, discouraged spectrum warehousing, and encouraged inter-operator coordination – goals that are appropriate in additional spectrum bands as well.<sup>17</sup> SES/O3b points out that this regime creates an efficient means of establishing a baseline for handling in-line events while affording flexibility for the systems involved to arrive at an alternative approach.<sup>18</sup> And Lockheed Martin concludes

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<sup>15</sup> See, e.g., Boeing Comments at 19; OneWeb Comments at 1; SES/O3b Comments at 32-34.

<sup>16</sup> See SpaceX Comments at 16-18.

<sup>17</sup> See OneWeb Comments at 11-12.

<sup>18</sup> See SES/O3b Comments at 23-24.

that expanding this approach to additional bands will enable more timely and efficient spectrum use and ensure the requisite protection of GSO operations while providing NGSO operators with greater regulatory certainty.<sup>19</sup>

The few objections raised by commenters are not well founded. LeoSat and Telesat would prefer to rely on ITU priority to resolve sharing issues.<sup>20</sup> But the Commission adopted the in-line regime to simplify sharing issues by putting easily applied content into the generalized sharing obligation under international rules.<sup>21</sup> ViaSat worries that the in-line events approach could be unfair to smaller systems.<sup>22</sup> Yet the Commission has concluded that by establishing a default sharing mechanism, the avoidance of in-line events methodology ensures that “no licensee has any ability to impede the operations of any other licensee.”<sup>23</sup> Moreover, ViaSat overlooks the fact that smaller systems actually make sharing more difficult in many respects. Larger systems, with greater satellite diversity, have more options for serving a given customer from multiple satellites – an obvious strategy for avoiding in-line events. This option is not available to smaller systems with little or no overlap in their satellites’ footprints. Moreover, an NGSO system with few satellites would likely have to give each one a large footprint covered by relatively large beams, which would also increase the prevalence of in-line events but would limit that operator’s

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<sup>19</sup> See Lockheed Martin Comments at 2-3.

<sup>20</sup> See LeoSat Comments at 11; Telesat Comments at 14-15.

<sup>21</sup> See, e.g., *Ku-band NGSO Sharing Order*, ¶ 53 (“we find it necessary to adopt a ‘default’ sharing mechanism that can be understood and applied by the NGSO FSS operators themselves without further intervention by the Commission”); M. Daneman, “Route to Possible V-Band Spectrum Sharing Laid Out,” *COMMUNICATIONS DAILY* (Mar. 9, 2017) (quoting Jose Albuquerque: “The FCC thought it would not be advisable to authorize two systems that have a potential of causing interference to each other without clear rules.”).

<sup>22</sup> See ViaSat Comments at 22-23.

<sup>23</sup> *Ku-band NGSO Sharing Order*, ¶ 29.

flexibility in resolving them. By contrast, the greater agility of a system with a large number of satellites which each cover a relatively small footprint with tightly focused, steerable spot beams would facilitate coordination, and thereby reduce the likelihood that the default mechanism of band segmentation would be required. To the extent these circumstances create the potential for unfairness, it is the prospect that larger, more flexible NGSO systems would have to bear the burden of implementing spectrum sharing strategies for the benefit of smaller systems.

Telesat also asserts that the sharing situation would be made still more complicated by the introduction of mobile terminals.<sup>24</sup> However, such terminals are not yet authorized for use with NGSO FSS systems in these bands. There will be ample time to consider and resolve the issues specific to spectrum sharing for such operations in the context of developing a regulatory regime allowing the use of earth stations on moving platforms.<sup>25</sup>

## ***2. The Commission May Want to Review the In-Line Event Trigger Angle as Applied in Different Frequency Bands***

In its initial comments, SpaceX supported retention of the existing ten-degree trigger angle for the in-line events methodology because using a smaller trigger angle could preclude consumer-grade terminals operating in Ku-band spectrum.<sup>26</sup> Several other commenters argued that the trigger angle should be reviewed, as a reduction in the trigger angle could help reduce the number of in-line events and thereby facilitate inter-system coordination.<sup>27</sup> As Planet Labs/Spire Global

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<sup>24</sup> See Telesat Comments at 11-12.

<sup>25</sup> See, e.g., *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, 20 FCC Rcd. 674, ¶¶ 5-11 (2005) (discussing the extended timeline for domestic and international development of rules for earth stations on vessels).

<sup>26</sup> See SpaceX Comments at 19-21.

<sup>27</sup> See, e.g., SES/O3b Comments at 25; ViaSat Comments at 21. In addition, OneWeb argued for use of a 6 percent change in system noise temperature. See OneWeb Comments at 14. However, the Commission rejected such an approach over a decade ago. See *Establishment of Policies and Service Rules for the Non-Geostationary Satellite*

suggested, the Commission could use the parameters of current and planned NGSO systems detailed in the two ongoing processing rounds as a basis for analysis.<sup>28</sup> And as Boeing argued, the differing characteristics of the various spectrum bands used for NGSO operations could warrant different trigger angles.<sup>29</sup>

SpaceX believes that such a review could be beneficial. It seems likely that higher frequency bands could be amenable to a smaller trigger angle. The current pendency of two NGSO processing rounds affords the Commission a rare opportunity to perform an analysis using the varying system designs and range of operational characteristics actually proposed for deployment in the near future in several bands. Moreover, this analysis would coincide with reviews by regulatory authorities in other countries considering the appropriate parameters for an in-line avoidance regime,<sup>30</sup> and thus could be an opportunity for additional harmonization. In conducting this analysis, however, the Commission would have to remain cognizant of the need to ensure that any new rule would not require such high performance from transmitting earth stations that it would increase price points and complicate form factors to a degree that would effectively preclude low-price terminals for consumer service offerings.

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*Orbit, Fixed Satellite Service in the Ka-Band*, 18 FCC Rcd. 14708, ¶ 32 (2003) (“The comments are unanimous in rejecting a definition based on the change in total system noise power. We are persuaded by the comments that the physical differences of NGSO systems render that measurement – which is successfully used in a geostationary satellite orbit environment – unfit for this purpose.”).

<sup>28</sup> Planet Labs/Spire Global Comments at 5-7.

<sup>29</sup> Boeing Comments at 12-15.

<sup>30</sup> See, e.g., Innovation, Science, and Economic Development Canada, “Consultation on the Licensing Framework for Non-Geostationary Satellite Orbit (NGSO) Systems and Clarification of Application Procedures for All Satellite Licence Applications,” ¶¶ 40-48 (Mar. 2017), available at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11263.html>.

### ***3. The Commission Should Clarify the Geographic Scope of the In-Line Events Sharing Methodology***

SES/O3b requests that the Commission clarify the geographic scope over which the in-line events regime applies. Specifically, SES/O3b asserts that it should apply only with respect to NGSO systems communicating with earth stations operating in U.S. territory.<sup>31</sup> The Commission has never directly addressed this issue. It should take this opportunity to declare that this methodology applies worldwide to both U.S.-licensed NGSO systems and non-U.S. licensed NGSO systems that have been granted access to the U.S. market.

Ever since the Commission first established a procedure for non-U.S. licensed satellite systems to seek access to the U.S. market, it also required those systems to demonstrate that they would comply with the Commission's rules. The Commission reasoned that "[o]ther countries have not adopted the same spectrum-maximizing technical requirements," and therefore the Commission must require foreign-licensed satellite systems to comply with those technical requirements because otherwise they "may cause unacceptable interference with U.S. systems and possible service disruptions to customers."<sup>32</sup> As a result, the Commission concluded that "non-U.S. systems will be required to comply with the same financial, technical and legal qualifications, observe the prohibition against exclusive service arrangements, and comply with other general service rules applicable to U.S. systems."<sup>33</sup> Indeed, in granting O3b's NGSO system access to the

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<sup>31</sup> See SES/O3b Comments at 26.

<sup>32</sup> *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, 12 FCC Rcd. 24094, ¶ 156 (1997).

<sup>33</sup> *Id.* ¶ 15.

U.S. market, the Commission conditioned that access upon compliance with the avoidance of in-line interference rules codified in Section 25.261.<sup>34</sup>

SES/O3b contends that this condition should apply only with respect to communications with earth stations located in the U.S. It does not, however, cite any Commission precedent to support that contention. The Commission has considered a somewhat analogous question in the GSO context. For decades, the Commission's rules for GSO systems have been built around two-degree orbital spacing between spacecraft to ensure efficient use of orbital/spectrum resources.<sup>35</sup> The Commission recently addressed the applicability of this regime to U.S. and foreign GSO satellites, holding that with respect to coordination between two U.S.-licensed space stations, "the default two-degree spacing rules apply to operations anywhere in the world."<sup>36</sup> It went on to explain, however, that "the two-degree spacing rules apply only to those non-U.S. licensed space station operations that fall within the scope of a grant of U.S. market access," such that "transmissions between non-U.S. licensed space stations and non-U.S. earth stations are not subject to the policy."<sup>37</sup>

At a minimum, therefore, the in-line events spectrum sharing methodology should apply with respect to two U.S.-licensed NGSO systems operating anywhere in the world. However, material differences between GSO and NGSO operations justify a more expansive application of

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<sup>34</sup> See Grant Stamp, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004, ¶ 10 (Mar. 12, 2015).

<sup>35</sup> See, e.g., *Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions of Part 25 of the Rules and Regulations*, FCC 83-184, 54 Rad. Reg. 2d 577 (rel. Aug. 16, 1983) (establishing two-degree spacing regime).

<sup>36</sup> *Comprehensive Review of Licensing and Operating Rules for Satellites Services*, 30 FCC Rcd. 14713, ¶ 122 (2015) ("Satellite Review Order").

<sup>37</sup> *Id.*

the rule in the NGSO context. A GSO satellite remains at a fixed orbital location, from which it provides service to a fixed area, which often times covers an entire hemisphere. These characteristics allow GSO operators to make a single determination of which beams serve the U.S. and which ones do not, and coordinate accordingly. NGSO satellites, by comparison, are constantly in motion relative to the Earth, and each one is likely to provide service to the U.S. at some point during its orbital rotation. Rather than apply one regime when an NGSO satellite is near the U.S. and another when it is elsewhere – or have U.S. systems sharing in one way with other U.S. systems but in another way with non-U.S. systems – it is more practical and equitable to apply the in-line avoidance mechanism to all systems at all times. Accordingly, those non-U.S. licensed systems that choose to serve the U.S. market should also be bound by the Commission’s spectrum sharing rules no matter where they are operating.

### **C. COMMENTERS SUPPORT MAKING ADDITIONAL SPECTRUM AVAILABLE FOR FSS OPERATIONS**

Commenters unanimously supported the Commission’s proposals to increase the spectrum available for FSS operations, whether through a new allocation in the 17.8-18.3 GHz band or through reinstating secondary designations for NGSO and GSO operations in additional portions of the Ka-band. Commenters also uniformly urged the Commission not to constrain deployment in the 17.8-18.3 GHz band to individually-licensed earth stations only. Indeed, several commenters argued that individually-licensed earth stations should be given co-primary status in this band, with blanket-licensed user terminals allowed to operate on a secondary basis.<sup>38</sup> SpaceX supports that approach. Individually-licensed earth stations generally represent both a large

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<sup>38</sup> See Comments of Inmarsat at 3 (“Inmarsat Comments”); Comments of Intelsat License LLC at 2 (“Intelsat Comments”); LeoSat Comments at 4; OneWeb Comments at 30; SES/O3b Comments at 10.

monetary investment and a critical component in the satellite network. Such assets cannot be subject to constant risk that future terrestrial networks could compromise their operations or render them entirely useless. Unlike ubiquitously deployed user terminals, these earth stations should be relatively few in number scattered across the United States, and thus will not materially constrain deployment of terrestrial systems. In addition, this approach would better align the Commission's rules with spectrum use in other countries.<sup>39</sup>

There was greater division with respect to the possibility raised in the *NPRM* of granting GSO systems co-primary status with NGSO systems in the 18.8-19.3 GHz and 28.6-29.1 GHz bands. Three GSO operators supported that approach.<sup>40</sup> Yet every NGSO operator that addressed this issue (including SpaceX) disagreed, arguing that the Commission should preserve NGSO priority in these bands.<sup>41</sup> The Commission has recognized that designating certain spectrum for NGSO use "is necessary to accommodate the increasing worldwide demand for [Ka-band] spectrum for NGSO FSS systems."<sup>42</sup> Applying this principle, the Commission has created spectrum ideally suited for ubiquitous deployment of user terminals, unconstrained by the additional operational complexity of protecting GSO operations.<sup>43</sup> Moreover, as Boeing points

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<sup>39</sup> For example, FSS and FS are co-primary in the 17.8-18.3 GHz band under the international allocation table. In recognition of this fact, other administrations have adopted rules for co-primary spectrum sharing. *See, e.g.*, CEPT Electronic Communications Committee, ERC Decision (00)07, at 4-5 (Mar. 4, 2016), *available at* <http://www.eroocdb.dk/docs/doc98/official/pdf/Dec0007.pdf>.

<sup>40</sup> *See* Inmarsat Comments at 1-2; Intelsat Comments at 3; ViaSat Comments at 8-9.

<sup>41</sup> *See* SpaceX Comments at 5-6; Boeing Comments at 5; SES/O3b Comments at 13; OneWeb Comments at 2; Space Norway Comments at 4.

<sup>42</sup> *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, 11 FCC Rcd. 19005, ¶ 59 (1996).

<sup>43</sup> For this reason, SpaceX agrees with those commenters who argued that the Commission should not adopt the international EPFD limits applicable in bands shared equally by GSO and NGSO systems, since that would negate



out, the Commission's designation of this spectrum has a strong influence in coordination negotiations even outside the U.S.<sup>44</sup> Indeed, contrary to Intelsat's assertion,<sup>45</sup> this designation should control coordination among NGSO and GSO systems licensed by the Commission even when operating outside the United States.<sup>46</sup> The Commission should preserve this spectrum as one of the few bands where deployment of NGSO user terminals is most practicable.

#### **D. THE COMMISSION SHOULD NOT ADOPT DEFAULT OPERATIONAL RULES AT THIS TIME**

The *NPRM* requested comment on the possibility of adopting EIRP density limits on NGSO FSS uplink transmissions, downlink power limits, and earth station receive gain criteria similar to those applicable to GSO systems.<sup>47</sup> In theory, adopting such default limits could facilitate spectrum sharing among NGSO systems. However, SpaceX agrees with Boeing and OneWeb that adopting such limits at this early stage in the development of NGSO systems could constrain ongoing technological development and future innovation.<sup>48</sup>

NGSO operators already have strong incentives to operate as efficiently as possible in order to maximize capacity and provide a high-quality customer experience. The limits applied for GSO systems would be particularly inappropriate for general application to all NGSO systems. While O3b's MEO system may be able to conduct its business-to-business operations within those

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the primary designation for NGSO systems in the U.S. *See* OneWeb Comments at 16; SES/O3b Comments at 13; Space Norway Comments at 4.

<sup>44</sup> Boeing Comments at 5.

<sup>45</sup> *See* Intelsat Comments at 3.

<sup>46</sup> *Compare Satellite Review Order*, ¶ 122 (clarifying that the Commission's two-degree spacing rules apply to the operations of U.S.-licensed GSO systems anywhere in the world).

<sup>47</sup> *NPRM*, ¶ 30.

<sup>48</sup> *See* Boeing Comments at 15-16; OneWeb Comments at 20.

parameters, many other systems – especially those targeting individual customers – would not. Here again, the Commission must take care not to foreclose innovative services that rely upon smaller, less expensive terminals to bring broadband direct to end users in underserved areas and thereby help bridge the digital divide. The Commission would be better served by waiting to see how the NGSO industry develops, and making a determination of whether additional rules are advisable based on more experience and data.

**E. THE COMMISSION SHOULD NOT ADOPT A DEFAULT PRESUMPTION THAT NGSO SYSTEMS MUST PROTECT GSO SYSTEMS IN ALL FREQUENCY BANDS THAT LACK SHARING RULES**

Commenters uniformly supported the Commission’s proposal to eliminate the portion of Section 25.156(d)(5) that, in spectrum for which the Commission has not yet adopted criteria for GSO/NGSO sharing, precludes the grant of an NGSO license where a GSO license has previously been issued, and vice versa. Some commenters also argued that in place of that approach, the Commission should adopt a default presumption that NGSO systems are required to protect GSO systems in all such bands.<sup>49</sup>

To the contrary, SpaceX agrees with Boeing that no such default presumption should apply.<sup>50</sup> NGSO systems have the potential to provide innovative and compelling new services that are not constrained by the latency and other limitations inherent in communications with legacy GSO systems. There is no reason for the Commission to reflexively favor one system architecture over the other in the absence of a well-considered decision to do so. Rather, both NGSO and GSO applicants should have the flexibility to make a compatibility showing for assessment by the

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<sup>49</sup> See, e.g., Inmarsat Comments at 5; Space Norway Comments at 1.

<sup>50</sup> See Boeing Comments at 10-12.

Commission before formal sharing rules have been adopted, and should be on equal footing in doing so.

Respectfully submitted,

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